CLAIMS

What is claimed is:

1. A method of analysis of nitric oxide quantity comprising:

providing a molecule capable of binding to nitric oxide and exhibiting a nitric oxide dependent paramagnetism affecting the spectral properties of at least one reporter nucleus in said molecule;

contacting said molecule with a tissue or fluid, exposing said molecule to a source of nitric oxide; and

measuring the paramagnetic properties of said molecule after said molecule is exposed to said nitric oxide in said tissue or fluid.

2. The method of claim 1 wherein said molecule contains a metal atom.

3. The method of claim 2 wherein said metal atom is iron.

4. The method of claim 3 wherein said iron is in the +2 ionization state.

5. The method of claim 1 wherein said method is performed in an animal.

6. The method of claim 5 wherein said animal is a mammal.

7. The method of claim 6 wherein said mammal is a human.

8. The method of claim 1 wherein said molecule is naturally occurring.

9. The method of claim 8 wherein said molecule is synthetic.

10. The method of claim 3 wherein said molecule comprises a porphyrin together with at least one reporter nucleus.

11. The method of claim 10 wherein said porphyrin is a heme group.

12. The method of claim 11 wherein said heme group is located in a hemoglobin molecule.

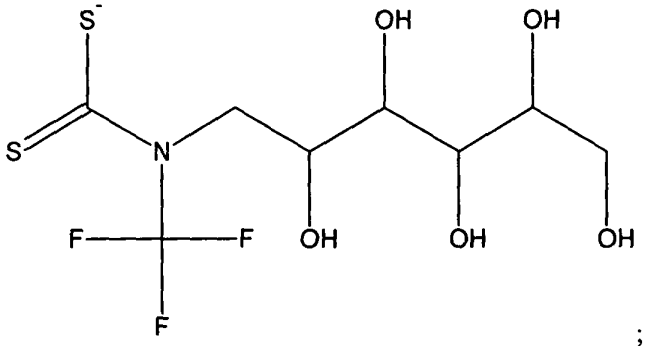
13. The method of claim 11 wherein said heme group is located in a myoglobin molecule.

14. The method of claim 10 wherein said porphyrin is synthetic.

15. The method of claim 2 wherein said molecule is a dithiocarbamate, together with at least one reporter nucleus.

16. The method of claim 15 wherein said dithiocarbamate is bound to a functional group, said functional group providing one of: solubility, target tissue affinity, or tissue permeability.

17. The method of claim 1 wherein said molecule is selected from the group consisting of dithiocarbamates of the following:



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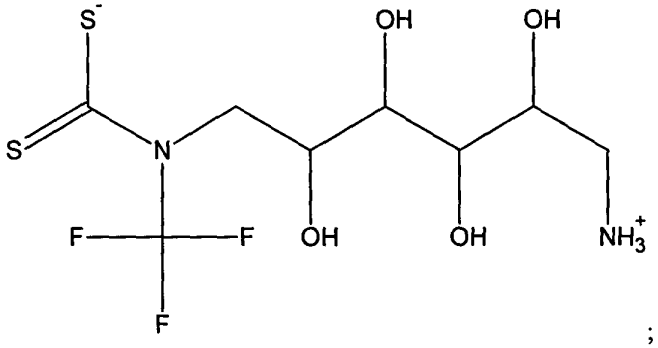

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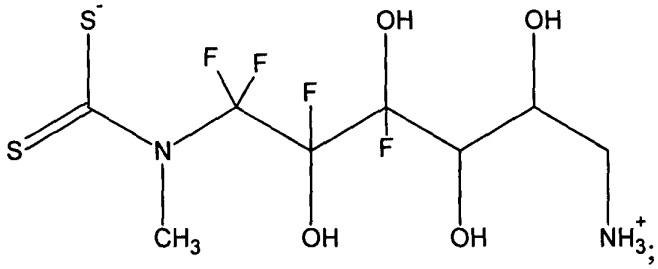

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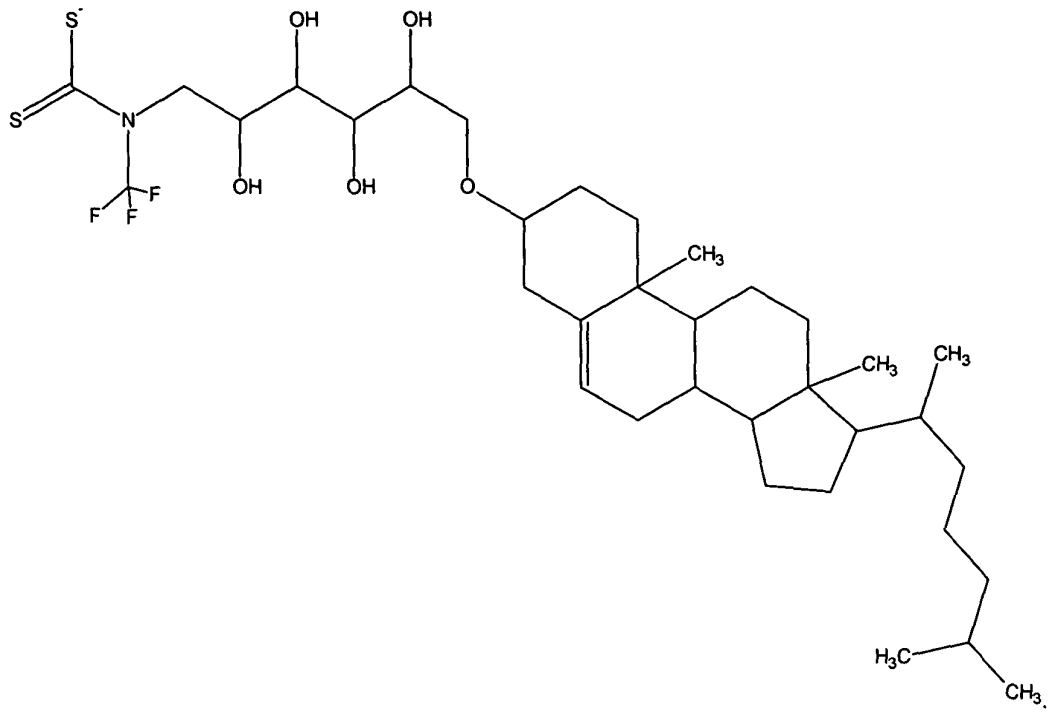


18. The method of claim 1 wherein said measurement of paramagnetic properties is performed by nuclear magnetic resonance.

19. The method of claim 1 wherein said measurement of paramagnetic properties is performed by nuclear magnetic imaging.

20. The method of claim 19 wherein said exposure to nitric oxide is in a tissue.

21. A contrast agent for nuclear magnetic resonance spectroscopy adapted for use in a living tissue comprising at least one reporter nucleus, together with a pharmaceutically acceptable carrier, said contrast agent exhibiting a first spectral property when not bound by nitric oxide, and a second spectral property when bound by nitric oxide.

22. The contrast agent of claim 21 wherein a plurality of reporter nuclei are present in said contrast agent.

23. The contrast agent of claim 21 wherein said reporter nucleus is selected from the group consisting of ^{19}F, ^{13}C, ^{31}P, and deuterium.

24. The contrast agent of claim 21 wherein nitric oxide is complexed with a metal ion in said contrast agent.

25. The contrast agent of claim 24 wherein said metal ion is an iron atom.

26. The contrast agent of claim 25 wherein said iron atom is in the Fe^{+2} oxidation state.

27. The contrast agent of claim 24 wherein said contrast agent comprises a porphyrin molecule.

28. The contrast agent of claim of 21 wherein said living tissue is in an animal.

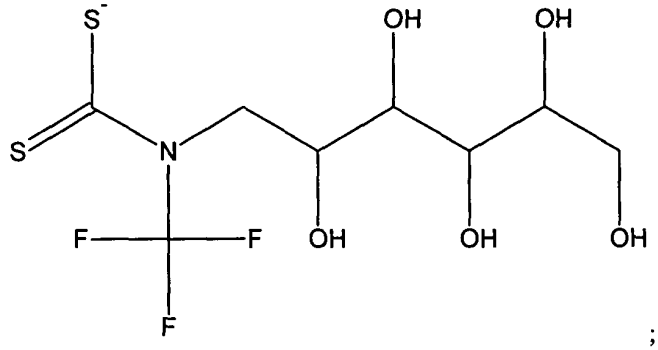
29. The contrast agent of claim 28 wherein said animal is a mammal.

30. The contrast agent of claim 29 wherein said mammal is a human.

31. The contrast agent of claim 21 wherein said contrast agent comprises a dithiocarbamate together with at least one reporter nucleus.

32. The contrast agent of claim 21 wherein said dithiocarbamate contains a plurality of reporter nuclei.

33. The contrast agent of claim 21 wherein said contrast agent is selected from the group consisting of dithiocarbamates of the following:



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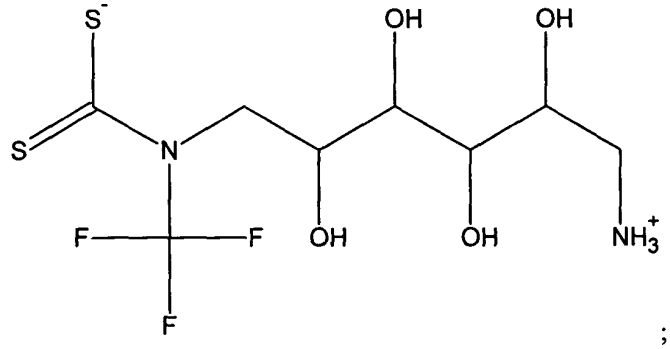

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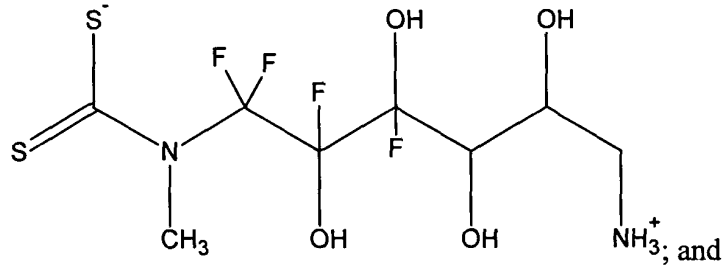

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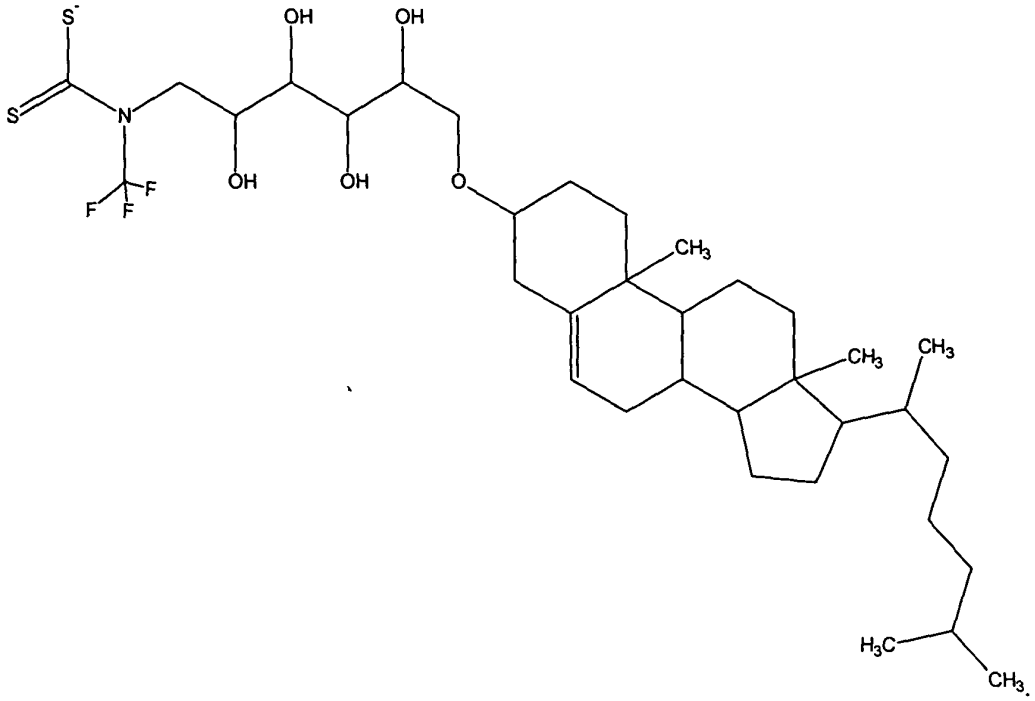

34. The contrast agent of claim 21 wherein said contrast agent comprises a porphyrin together with at least one reporter nucleus.

35. The contrast agent of claim 34 wherein said porphyrin is a heme group.

36. The contrast agent of claim 35 wherein said heme group is located in a hemoglobin molecule.

37. The contrast agent of claim 35 wherein said heme group is located in a myoglobin molecule.

38. The contrast agent of claim 34 wherein said porphyrin is a synthetic porphyrin.